New claims

1. Material based on SiAlONs with a component A consisting of alpha- and beta-SiAlON and an amorphous or partially crystalline grain-boundary phase and a component B, a hard material, characterised by a composition of 70 to 97 vol.% of component A and 3 to 30 vol.% of component B, wherein in a sintered compact the material has an alpha-SiAlON gradient which falls from the outside in and the alpha-SiAlON content of the as-fired surface can be up to 100%.

2. Material according to claim 1, characterised in that SiC, Ti(C,N), TiC, TiN, carbides and/or nitrides of elements from groups IVb, Vb and VIb of the periodic table, as well as scandium carbide and/or scandium oxycarbide or mixtures of the cited hard materials, are used as hard materials, component B, whose state remains unchanged after sintering.

3. Material according to claim 1 or 2, characterised in that the content of grain-boundary phase is less than 10 vol.%, preferably less than 5 vol.%, and that the grain-boundary phase is amorphous.

4. Material according to claim 1 or 2, characterised in that the content of grain-boundary phase is less than 10 vol.%, preferably less than 5 vol.%, and that the grain-boundary phase is partially crystalline.

5. Material according to one of claims 1 to 4, characterised in that the grain-boundary phases contain crystalline phases, preferably aluminium-containing melilite or disilicate.

6. Material according to one of claims 1 to 5, characterised in that the maximum size of the alpha- and beta-SiAlON grains is less than 90 µm,

preferably less than 65 µm, particularly preferably less than 50 µm.

7. Material according to one of claims 1 to 6, characterised in that the average grain size of the hard materials is less than 30 µm, preferably less than 15 µm, particularly preferably less than 5 µm.

8. Material according to claim 7, characterised in that the hard material grains are globular, whisker-shaped or platelet-shaped.

9. Material according to one of claims 1 to 8, characterised in that its hardness is > 1550 HV 10.

10. Material according to one of claims 1 to 9, characterised in that it is coated with wear-reducing coatings such as Al_2O_3, TiN or TiC.

11. Process for producing a material based on SiAlONs according to one of claims 1 to 10 by powder mixing, shaping, sintering and grinding, as is used in the production of high-performance ceramic components, particularly those made from SiAlON materials.

12. Process according to claim 11, characterised in that component A is formed during a heat treatment at temperatures of 1800 to 2000°C and retention times at the maximum temperature of 0.5 to 5 hours.

13. Process according to claim 11 or 12, characterised in that the gas atmosphere during sintering is inert and contains N_2 or a mixture of N_2 and other inert gases, particularly argon.

14. Material according to one of claims 1 to 10, produced by a process according to claims 11 to 13, for use as a cutting material.

15. Material according to one of claims 1 to 10, produced by a process according to claims 11 to 13,

for use as a cutting material for machining grey cast iron.

16. Material according to one of claims 1 to 10, produced by a process according to claims 11 to 13, for use as a sealing ring.

17. Material according to one of claims 1 to 10, produced by a process according to claims 11 to 13, for use in fuel and coolant pumps, compressors, turbochargers, heat exchangers and air conditioning systems.